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DOI: 10.1213/ANE.0b013e31827080ae

Beware of Lung Complications When Using Guidewire-Assisted Nasogastric Tube Insertion

To the Editor

We agree with Kirtania et al.[1] that using a Savary-Gilliard (SG) guidewire along with gentle manual forward displacement of the larynx increases the likelihood for success of nasogastric tube (NGT) insertion in anesthetized and tracheally intubated patients.

Since 2006, we have used an SG guidewire whenever the patients require insertion of an NGT under general anesthesia.[2] We have 13 operating rooms and perform approximately 800 operations every month, one third to half of which require insertion of an NGT. We have an SG guidewire in each operating room and reuse them after proper sterilization.

However, there are several differences between the technique and results of Kirtania et al. and our experience. First, we do not alter the handle of the SG guidewire. Rather than keeping it inside the sheath, we store it to maintain its intrinsic curvature.

Second and in contrast to Kirtania et al.,[1] who report an absence of serious complications, during the 7 years of its use, we have seen 11 cases of lung-related complications including placing the NGT into the trachea near the carina or bronchi (5 cases), pneumothorax (3 cases), and carinal bleeding (3 cases). Two of these cases required treating a pneumothorax using chest tube drainage during anesthesia. We therefore recommend using a method such as ultrasonography[3] to confirm placement of the NGT guidewire assembly as well as to detect the presence of complications such as pneumothorax.

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DOI: 10.1213/ANE.0b013e31827696df

In Response

Insertion of the endoscopic guidewire-assisted esophageal dilators, with or without fluoroscopic guidance, is as commented on by Chon et al., occasionally associated with severe complications (0.1% to 0.22%) including esophageal perforation and pneumomediastinum.[1–4] Causes of severe complications include patient factors such as tight esophageal strictures and malignant esophageal diseases, operator inexperience, or might be related to the Savary-Gilliard wire guide, the endoscope, and the Savary-Gilliard esophageal dilators.[2]

Our study excluded patients with esophageal strictures as screened by clinical history and surgical workup.[5] Also, our study was related to the procedure of nasogastric tube (NGT) insertion in patients with an anatomically normal esophagus.[5] Manual forward displacement of the larynx probably safeguards against laryngeal entry of the wire guide–NGT assembly, while it passes from the hypopharynx into the cervical esophagus. The Savary-Gilliard wire guide also has a progressively flexible tip, which is again sheathed inside an NGT and follows the path of least resistance in the hypopharynx to the esophagus, since the laryngeal inlet is already blocked by the cuffed tracheal tube and displaced anteriorly by gentle manual traction.[5]

For any blindly performed wire guide–assisted clinical procedure, the most important principle is to "stop and retreat whenever any undue resistance is encountered." Live fluoroscopy is perhaps the "gold standard" to guide the safe placement of any esophageal device. However, it is cumbersome, costly, and involves exposing the patient and the operator to ionizing radiation.

Transcutaneous cervical esophageal ultrasound is a standard technique used by radiologists and gastroenterologists to measure esophageal wall thickness and luminal diameter as an adjunct to diagnosis of gastroesophageal reflux disorders.[6] This might be helpful in guiding NGT placements in patients who are not tracheally intubated.[7]

We performed in-plane approach high-resolution B-mode ultrasound (using a high-frequency linear probe of the LOGIQ e USG console, GE Healthcare, Wauwatosa, WI) to visualize the passage of the NGT with and without laryngeal traction in 3 anesthetized and tracheally intubated patients. Although the trachea with the tracheal tube was clearly visible entirely along the long axis, the esophagus with the NGT was barely visible and that too from the right side only. With manual laryngeal displacement, visualization was even more difficult due to artefact from the operator's fingers in the laryngoesophageal groove. Of course, an ill-defined motion artefact induced by the NGT movement was visualized.

We suggest that real-time ultrasound imaging of the cervical esophagus in tracheally intubated patients requires refinement and standardization before being useful to the clinician as a tool to monitor the safe passage of the NGT.

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DOI: 10.1213/ANE.0b013e318276970c

Which Is the Original and Which Is the Modified Rapid Sequence Induction and Intubation? Let History Be the Judge!

To the Editor

Based on their recent survey, Ehrenfeld et al.[1] identified 3 components of the "modified" rapid sequence induction and intubation (RSII) technique: (1) oxygen administration before induction, (2) the use of cricoid pressure (CP), and (3) an attempt to ventilate the patient's lungs before securing the airway.[1]

A review of the pertinent literature since the inception of RSII allows us to judge the validity of applying the adjective "modified" to this technique. Suggestions to use the "intravenous barbiturate/muscle relaxant/rapid intubation" technique in patients at risk of aspiration of gastric contents originally appeared in the 1950s in the British anesthesia literature. A 1951 recommendation by Morton and Wylie[2] led to the widespread use of the technique with the patient in the sitting position. In 1959, Snow and Nunn[3] described the technique as "a rapid induction of anesthesia with thiopentone and suitable relaxant combined with foot-down tilt." They used a 40-degree head-up tilt so that the larynx would be raised to a height above the cardia greater than the intragastric pressure. After the introduction of CP by Sellick[4] in 1961, CP gained acceptance worldwide and rapidly became an integral component of the RSII technique. The CP maneuver seemed to overcome many of the disadvantages of the sitting position.[4] In their reports, Snow and Nunn,[3] as well as Sellick,[4] emphasized the importance of oxygen administration before anesthetic induction. Furthermore, manual ventilation before securing the airway with an endotracheal tube was an integral component of the technique.[3,4] In fact, Sellick[4] used CP to prevent gastric inflation during manual ventilation. Thus, it is obvious that these early investigators recommended and used manual ventilation before intubation during RSII.

In 1963, Wylie[5] introduced the concept that "inflation of the patient's lungs with oxygen must *not* be carried out until endotracheal intubation has been completed." This view was also held by Stevens,[6] who in 1964 wrote, "lungs must not be ventilated until the cuffed endotracheal tube is in place." Both of these authors hypothesized that positive pressure ventilation before intubation increases the risk of gastric inflation and the potential for regurgitation.[5,6] Thereafter, avoidance of manual ventilation during RSII, before tracheal intubation, has been perpetuated in reviews and textbooks.[7–9] This has led to the current teaching, which erroneously refers to the original (classic) RSII technique as the one in which manual ventilation is avoided until tracheal intubation is accomplished, and the modified RSII technique as the one in which manual ventilation is allowed. Our historical review of the literature reveals that the opposite is true! We suggest that the "original" or "classic" RSII technique should indicate the use of positive pressure ventilation before intubation, whereas the "modified" RSII technique should indicate the avoidance of positive pressure ventilation.

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